"Biochemical studies on the effect of phloretin and other substances on rheumatic disease in experimental animals."

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By

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SUMMARY

RA is a long-term, systemic, and autoimmune inflammatory disease that predominantly affects the synovial joints. It arises when the immune system wrongly attacks the body's tissues, especially the lining of the joints (synovium), which causes pain, swelling, stiffness, and eventually destroys the joints. RA can harm the lungs, heart, and eyes over time, as well as bones and joints.

Plaquenil was first made to treat malaria, but now it is commonly used to treat autoimmune diseases like RA as an anti-inflammatory and immunomodulatory drug.

Phloretin is a naturally occurring dihydrochalcone flavonoid that is mostly found in apples and apple trees. It has been shown to have many biological properties, including being an antioxidant, anti-inflammatory, anticancer, and antibacterial. It changes important signaling pathways like NF-κB, MAPKs, and Nrf2, which implies that it could be useful in treating illnesses like RA that include oxidative stress and chronic inflammation.

The present study aimed to evaluate the anti-inflammatory and anti-arthritic effects of phloretin, both individually and in combination with Plaquenil, in a rat model of RA induced by CFA.

Forty-eight male albino rats were randomly assigned to eight groups (n = 6 per group):

Group I as the control group.

Group II (Plq): received Plaquenil at 124 mg/kg body weight (BW) orally for 3 weeks.

Group III (Ph): received phloretin at 25 mg/kg BW orally for 3 weeks.

Group IV (CFA): received a single 0.1 mL subcutaneous injection of CFA into the left hind paw.
Group V (Plq Tr): received CFA followed by Plaquenil for 3 weeks.
Group VI (Ph Tr): received CFA followed by phloretin for 3 weeks.
Group VII (Plq & Ph Tr): received CFA followed by both Plaquenil and phloretin for 3 weeks.
Group VIII (Ph Pr): received phloretin for 2 weeks before and 3 weeks after CFA induction

Our study showed a significant increase in WBCs, ESR, RF, Anti-CCP, TNF-α, IL-6, MDA, GPT, GOT, Urea, and Creatinine levels, and a marked drop in TAC levels and X-ray showed marked narrowing of joint space and diffuse swelling of the surrounding soft tissue and histopathological examination showed changes in articular cartilage and destruction of the adjacent bone in the CFA group compared to the control. Treatment with phloretin, Plaquenil, or their combination significantly ameliorated these pathological changes. Notably, the combination therapy showed enhanced protective and therapeutic effects compared to individual treatments.

Conclusion: Phloretin alone or in combination with Plaquenil exhibits significant anti-arthritic activity in the CFA-induced RA model in rats. These effects are supported by improvements in inflammatory biomarkers, radiographic findings, and histological assessments, suggesting the potential of Phloretin as a complementary therapy in RA management.